REMARKS

Applicants appreciate the time taken by the Examiner to review Applicants' present application. This application has been carefully reviewed in light of the Official Action mailed May 4, 2005. Applicants respectfully request reconsideration and favorable action in this case.

Title Objections

The Examiner objected to the title as not descriptive of the elected claims. Applicants have amended the title accordingly and request withdrawal of this objection.

Claim Objections

Claims 37 and 46 stand currently objected to as being dependent base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. New Claims 55 and 56 are substantially similar to Claims 37 and 46, respectively. Therefore, Applicants respectfully request allowance of these claims.

Rejections under 35 U.S.C. § 102

Claim 30

Claims 30, 33 and 51-54 stand rejected as anticipated by U.S. Patent No. 4,818,994 ("Orth"). Applicants respectfully submit, however, that Claim 30 is distinguishable from Orth.

The present invention provides a method for digitally controlling a sensor system. The sensor system includes, for example, a capacitance sensor and an analog front end ("AFE") that produce an analog sensor signal. One or more components, such as a gain amplifier and zero offset module, modify the analog sensor signal prior to digitization by an analog-to-digital converter. The components that modify the analog sensor signal (e.g., the gain amplifier and zero offset module) are controlled by a DSP. For example, the DSP can zero adjust the zero offset module to account for drift or adjust the gain of the gain amplifier. *See,* '793 Application, ¶¶0029-0030, 0034-0035 and 0037.

Prior to the present invention, adjustment of gain amplifiers and zero offset modules required the adjustment of potentiometers by a technician. The present invention eliminates the need for such potentiometers, which are susceptible to incorrect adjustment and which typically

have high temperature coefficients. The DSP can automatically control the gain amplifier and zero offset module, improving gauge performance. *See*, '793 Application, ¶0031.

Claim 30, as amended, recites:

> A method for *digitally controlling a sensor system* comprising:
> receiving an analog sensor signal;
> converting the analog sensor signal to a digital sensor signal; and
> processing the signal to provide an output signal indicating a measured parameter corresponding to the sensor signal; and
> *digitally controlling one or more components operable to modify the analog sensor signal prior to digitization.* [Emphasis Added]

The method of Claim 30 is not merely a method for <u>digitally processing</u> sensor signals, but is a method for <u>digitally controlling</u> the sensor system itself including one or more components that modify the analog sensor signal prior to digitization. For example, the DSP can implement digital controls to determine the drift of the sensor or AFE and provide this information to the zero offset adjustment module. *See*, '793 Application, ¶0056.

Orth is silent as to the processing that occurs to analog sensor signals produced by sensors 24, 28 and 34 prior to being converted to digital signals by the respective analog to digital converters 26, 32 and 36. There is certainly no digital control of components that modify the analog sensor signal prior to digitization disclosed. Consequently, Orth does not anticipate Claim 30.

<u>Rejections Under 35 U.S.C. § 103</u>

<u>Claim 34</u>

The Examiner rejected Claim 34 as being obvious in light of Orth despite the fact that Orth does not teach or suggest the limitations of Claim 34.

Claim 34 recites:

> The method of claim 30, further comprising performing iterations of a control loop in a kernel module, wherein the control loop comprises execution of all of a set of high priority tasks and execution of one or more low priority tasks.

The Examiner recognizes that Orth does not teach a kernel module that performs iterations of a control loop, but goes on to state:

> Orth et al do teach (see e.g., column 3 lines 27 et seq) controlling the analog loop current to provide an analog signal representative of sensed pressure or alternatively generating the loop and serial digital output signal and other means of processing the signal to perform both high and low priority tasks (e.g., temperature correction/compensation). In view of this teaching and because it would have been a simple and expedient modification to have done so, it is considered to have been obvious to one having ordinary skill in the art at the time of the invention to have performed iterations of a control loop in a kernel module for high and low priority systems"

Applicants note that controlling the analog loop current to provide an analog signal representative of sensed pressure or alternatively generating the loop and serial digital output signal refer to alternative modes for communicating data from the system of Orth. There is nothing that teaches or suggests one of the methods is considered a high priority task and one a low priority task or that they are otherwise prioritized. While "FSK modulation can be at a higher frequency and lower amplitude" this merely has to do with avoiding interference between signals, not the priority of performing tasks. *See*, Orth, col. 3, lines 27-48.

It is further unclear as to what the Examiner is pointing to as "other means of processing the signal to perform both high and low priority tasks (temperature correction/compensation)" as there is nothing in Orth that teaches or suggests that temperature correction/compensation is considered a high or low priority task compared to other tasks. Priority is discussed with respect to the order in which bus arbitration logic 39 passes control of bus 20 to the various C/D converters. *See,* Orth, col. 4, line 45-col. 5, line 20. This priority scheme simply allows the bus to be arbitrated in a particular order and does not teach or suggest "a control loop that performs all of a set of high priority tasks and execution of one or more low priority tasks" as there are no higher priority/lower priority tasks disclosed. Moreover, there is no teaching or suggestion of a kernel module that performs the control loop.

The only alleged motivation on the record to modify Orth to implement features that are not actually taught or suggested in Orth is the Examiners assertion "it would have been a simple and expedient modification to have done so." The mere fact that a reference can be modified or that it is within the capabilities of one in the art to modify the reference does not

render the resultant combination obvious "unless the prior art also suggests the desirability of the combination." MPEP 2143.01. In this case, and as admitted by the Examiner, Orth does not teach performing iterations of a control loop in a kernel module and the only motivation provided for modifying Orth to do so is that, according to the Examiner, it would have been easy. There is nothing in the prior art reference Orth, however, that teaches this feature or suggests the desirability of this feature. Indeed, the only place that the desirability of "performing iterations of a control loop in a kernel module" that performs "all of a set of high priority tasks and at least one low priority task" can be found is in the '793 Application itself. Consequently, the Examiner has failed to provide a proper motivation to modify Orth and a *prima facie* case of obviousness has not been made.

Claims 43-44

Claims 43-44 and 47-49 were similarly rejected as being obvious in light of Orth even though Orth does not disclose each of the features of these Claims. Claim 43 recites:

> The method of claim 30, further comprising performing an automatic zero adjust procedure. [Emphasis Added]

Claim 44 recites:

> The method of Claim 43, further comprising controlling an analog zero adjust module according to control data generated by the automatic zero adjust procedure. [Emphasis Added]

Claim 43 recites an "automatic zero adjust procedure." As describe in the Specification, the automatic zero adjustment procedure eliminates the need for an adjustment potentiometer to perform zero adjust. The controller of the '793 Application is configured to monitor the pressure signal and automatically adjust the zero offset module in response to a command. Because the adjustment of the zero offset is automatically performed by the controller, the time required to adjust the zero offset is minimized. There is also reduced risk of incorrect adjustment. *See*, '793 Application, ¶¶0034-0035.

As discussed above, Orth does not discuss control of components, such as a zero offset module, that modify an analog sensor signal and therefore does not teach or suggest performing a zero offset adjust to adjust a zero offset module. Furthermore, there is no teaching or suggestion in the cited references that such a zero offset adjustment should occur automatically (e.g., controlled through control by a DSP) if it occurs at all.

To make up for the complete lack of zero offset adjustment in Orth, the Examiner states "zero adjustments are notoriously well known and widely used in the measuring art, and because Orth does explicitly address temperature compensation, it is considered to have been a mere obvious design choice to have included the same in the method of Orth if desired." Applicants note that the '793 Application discusses the application of zero offsets in the art and the shortcomings of prior art zero adjust procedures. Thus, while zero adjusts may have been "notoriously well known in the art," they did not provide for an automatic zero adjust procedure as recited in Claim 43.

Furthermore, the cited temperature compensation of Orth appears to occur using temperature coefficients that are applied after digitization of sensor signals. There is no teaching or suggestion in Orth that the temperature compensation scheme should adjust any components that modify the analog sensor signals. Consequently, there is no teaching or suggestion of "controlling an analog zero adjust module" based on the "automatic zero adjust procedure" as recited in Claim 44.

The zero adjust procedure, as described in the '793 Application, is not the mere application of a zero offset to an analog signal but is the modification of the zero offset module itself. *See*, '793 Application, ¶¶0034-0035. While the application of zero offsets was known in the art, as described in the '793 Application, zero adjust took place using potentiometers, <u>not using an automatic zero adjust procedure</u>. Therefore, Applicants respectfully traverse the Examiner's rejection and request that the Examiner allow Claims 43 and 44 or provide supporting references on the record for the rejection. *See*, MPEP 2144.03.

Applicants have now made an earnest attempt to place this case in condition for allowance. Other than as explicitly set forth above, this reply does not include an acquiescence to statements, assertions, assumptions, conclusions, or any combination thereof in the Office Action. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of the pending claims. The Examiner is invited to telephone the undersigned at the number listed below for prompt action in the event any issues remain.

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

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